WAR MEDICINE

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HYPERTHYROIDISM IN THE RECRUIT.[1]

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Hyperthyroidism is a condition which in civil life I have previously considered as almost exclusively a disease of women, and particularly of rather unstable women, in their youth. One of the greatest medical surprises to which I have been treated since on active service has been the large number of cases of this type which have come under my observation as a member of the Cardiovascular Board of the Seventy-seventh Division and in the medical wards of our base hospital.

It is perfectly true that my conclusions in regard to the true nature of this condition are open to question if one takes too seriously the title of my paper. The British have described precisely the same condition as I present under the heading of "The Effort Syndrome," or as "D. A. H.," which is real army English for disordered action of the heart. I have read many of their most excellent studies and have received from old students and friends serving with the British colors descriptions of their cases, and I have tried to consider with an open mind the whole complex problem. This group of circulatory phenomena forms an important and inseparable part of that still more uncertain condition known as "shell shock," and it occurs in many people who not only have never heard the song of the shell but particularly among many of those who most earnestly desire never to do so.

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The material which has come to me in the past five months has been so abundant, so absorbingly interesting, that I frankly confess that thus far I have had neither sufficient time nor ability to properly digest the subject; as a would-be "good soldier," many other problems have put most insistent demands on my time, interests and sympathy; but in spite of these I am anxious to at least present my viewpoint of this most important and serious problem in order that you may assist us in working out the most important circulatory problem which the war has thus far presented and one of the most frequent disqualifying factors of otherwise available soldier material.

Please do not consider me so egotistic as to consider for one moment that what seems to me the very natural conclusion that this group of symptoms is due to hyperthyroidism is solely my discovery; quite the contrary, for I believe it to be the prevailing opinion in regard to the problem which is accepted among clinicians in active service, although many, and notably the British authorities, who have had exceptional opportunities for the study of this picture, are induced to ascribe it as due to infection or to unknown agents which are but vaguely hinted at.

The most striking feature of these cases in nearly every instance is tachycardia. This is the sign because of which most of the cases report to the regimental medical officer or on which they apply for exemption or discharge. It is constant in practically all examples of the syndrome, though it varies very greatly in degree. It is present alike in recruits presenting themselves for initial examination, in those who report later, and after considerable drill and army routine may have further served to upset the mental emotional and circulatory equilibrium of these patients.

The tachycardia is rarely accompanied by arrhythmia even in cases of very marked degree, and polygraphic studies, except in instances complicated by other vascular conditions, show, aside from rapidity, few signs of abnormal action, except that in the same case there is under varying conditions usually great variation in the rate of systoles. Practically always the rate is increased by exercise, though there are exceptional cases in which, as in ordinary palpitation, exercise may slow the rate, especially when the attention is thereby distracted; but speed of action is even more constantly accelerated by excitement and disturbing emotional factors.

Closely associated with tachycardia is an obvious and subjective throbbing of the superficial vessels, notably of the carotids, of the brachials and even of the femorals, while that of the aorta, in moderately thin persons, is also quite evident. Naturally, in polygrams this throbbing of the vessels is very striking, and we have found this graphic method often the most secure way of differentiating this condition from the throbbing vessels of an aortic incompetence. Under excitement, instead of an increase in systolic stroke, there is a fall in the stroking power, and this is, as our tracings show, much more evident in the medium-sized vessels, as the smaller ones seem to contract while the larger vessels expand in their arc of pulsation. Naturally, with these symptoms and signs, there is a wide area of apical pulsation, and so violent is this at times that an actual sucking sensation is produced on the palpating palm at the diastole.

The heart sounds, because of their rapidity, are usually very difficult to analyze, but in a good many cases a soft systolic murmur is detected at the apex, and is transmitted at times with decreasing intensity toward the axilla. The marked alteration in the quality and occurrence of this murmur in the same case at different times is occasionally a striking diagnostic feature. Everything in the nature of graphic methods seems to indicate that these murmurs are functional and not organic in origin.

With these striking signs of circulatory derangement are many symptoms apparently secondarily consequent to the tachycardia. The capillary return is almost always much delayed. I have never seen a real capillary pulse in pure cases, but it is often closely simulated. Patients complain bitterly of an oppressive, and occasionally bursting pain in the region of the heart, and though doubtless many of them exaggerate the degree, one is very often able to demonstrate areas of hyperesthesia; that is, the head cardiac zones which the British authorities believe to be an important diagnostic feature of the disease. The pain is sometimes reflected into the left or right arm and shoulder as in angina pectoris. Sudden and rapidly succeeding flushing and paling of the face and upper thorax occurs as seen in ordinary exophthalmic goitre so commonly present in neurotic young women. The blood-pressure is very low, as is usually the case in tachycardia, except in hypertensive cases, and there is a notably low pulse-pressure in most instances. As has been shown by the various members of the British Cardiovascular Board, adrenalin causes an increase of the symptoms, and in my experience, which differs from that reported by the British, there is also apparently a hypersensibility to thyroid, though I have not pursued this investigation very far because of its evident danger. The nitrites markedly increase the symptoms and there is a general hypersensibility to the vasomotor dilators.

This symptom of tachycardia is not controlled by digitalis even when given in massive doses. The sedatives at times, notably the bromides, give marked relief in some instances, but are apparently without effect in others. Postural and emotional rest appear to be the most efficient measures of control. Cold applications to the precordium have little or no effect. Very closely associated with these definitely circulatory symptoms are those of dizziness and fainting. Commonly these attacks are accompanied either by a marked paling of the face or by a marked hyperemia. Such attacks are directly precipitated by exercise or by emotional stress, such as, for example, occurs during a physical examination. Next to the tachycardia the manifestations which seem most striking to me are numerous evidences of emotional instability, which is an invariable accompaniment of the disease. In some few subjects there is an effort to suppress these symptoms, but once the confidence of the patient is obtained or the barrier of reserve broken through the emotional temperament breaks forth, sometimes in epileptoid attacks, in bursts of passion, in tears, profanity or perhaps in convulsive muscular spasms.

Irritability of temper, headaches and insomnia are almost constant, and during aggressive periods an intense feeling of fear, apprehension and terror, often quite beyond the control of the patient, is manifest. Outbursts of emotionalism are followed by a stage of great exhaustion, almost amounting to prostration, in which the patient may appear to be *in extremis*. The palms of the hands and the soles of the feet become bathed in a copious perspiration, which is stone cold; local asphyxiæ, as in Raynaud's disease, appear and may persist for some time. They are rarely bilateral. Sometimes exhaustion appears suddenly and without apparent cause, in other instances it follows only mental, emotional or physical effort. The neurovascular instability is further shown by the *tâche cérébrale*, by dermographia, by urticarial rashes and by the almost constant symptom of tremor. This tremor is most marked ordinarily in the hands; it is fine, increased by intention, and though it occurs on both sides is very rarely synchronous or bilaterally equal. The very types of nationalities chiefly affected in this syndrome is a certain index of the strong emotional element in the disease. The Hebrews lead in over 50 per cent. of the numbers which have come under my observation, the Italians next, then the Irish, least of all is it seen in the negroes, among whom in about 5000 recruits I have observed but a single case, and that questionable.

Breathlessness at times, almost a dyspnea, is manifest, but without cyanosis or definite signs of asphyxia; they complain of great difficulty in breathing and of fear of suffocation; but deep inspiration is possible if they can be induced to attempt it. Probably allied to the circulatory symptoms are small variations in temperature. Occasionally the temperature (mouth) will reach as high as 100° F., but usually not more than 99° F. Again, a subnormal temperature may be found. Usually the surface of the body is cold, especially the hands and feet.

The deep reflexes are excited, especially the knee-jerks. Most of these patients are above the average in mental acuity, and it is lamentably frequent among promising material for non-commissioned officers, though doubtless seen most frequently of all in those persons, whether blameworthy or not, who are struck with terror at the idea of active service and many of whom are keenly desirous of avoiding it. It is of course a difficult matter in many instances of this kind to unravel the real from the imaginary or assumed and to prevent successful malingering, especially when the tachycardia is accentuated by the use of atropin or of other drugs such as tobacco. Curiously, I have found this method, the employment of tobacco for attempted evasion of service, mentioned by many of the older authors on military medicine; it is a time-honored and still popular procedure.

To return again to the physical signs of the disturbance: I have mentioned the tachycardia, with the throbbing of the superficial vessels, the neurovascular instability, the tremors and the emotionalism, manifested, as you will note in the plates, by the worried and apprehensive facial expression of the patients, oftentimes so characteristic that my artist, not a medical man, when sent into a ward has usually been able to promptly select the patient whom he had been summoned to sketch. In about two-thirds of the cases one sees a very definite thyroid hypertrophy or at least a prominence of the thyroid. In some instances this amounts to an actual goitre, and this has been very evident in nearly all the cases which have been under observation for several months or which give a history of some time standing. It is of course well recognized that the size of the goitre or its lack of size is no measure of the activity of thyroid secretion, but the fact that in the long-standing case goitre is a most marked and almost constant symptom is indeed striking. The goitre may be symmetrical, it may chiefly involve the isthmus, one or both lobes, or it may be entirely symmetrical. Whether or not it is to be connected with the sign or goitre, or not, nearly all the cases complain bitterly of a choking sensation and of constriction of the throat, though they but rarely describe a typical globus hystericus.

A very interesting factor notable in most of these cases, and of very direct bearing on the question of the role which hyperthyroidism plays in this condition, is the certain part which heredity plays in the syndrome. A considerable number of cases give a history of ancestral goitre, particularly on the maternal side and sisters, less commonly brothers of the patients commonly show similar goitre.

There is also, in most instances, a familial history of nervous instability of hysteria, insanity perversions or of genius.

Exophthalmos, which is so striking a feature of ordinary exophthalmic goitre, as we see it so commonly in women, is present also in long-standing instances of this type. Not infrequently it develops very suddenly: it may be bilateral or monolateral or it may vary in either eye. During periods of excitement it is of course most evident, and as the tachycardia and emotionalism subside so also does the exophthalmos. I have seen, however, but a few cases which showed in any typical degree either von Graefe's or Stellwag's signs, but nearly all, especially in the more active instances, show more or less reddening of the conjunctivæ, with a desiccation of the membrane and complain of a strained sensation of the eyes.

Thus it will be seen that these cases present, though in perhaps mild degree in some instances, all the cardial signs and symptoms of true Basedow's disease or exophthalmic goitre. Hence my assumption which I believe justifies the title that I have given my paper.

These patients endure the acute infections very badly; simple catarrhal colds, bronchitis and slight surgical incidents are all very poorly tolerated, while pneumonia, measles, scarlet fever and the like are much more serious in them than in others. Tobacco also apparently produces in them much more serious symptoms than in the average; so evident is this that most patients voluntarily give it up, confessing that it causes or increases cardiac pain, breathlessness, nervousness and dyspnea.

We also have noted, what has particularly impressed the British observers—namely, a distaste of these patients for alcohol. This is manifest even in those previously long accustomed to the use and appreciation of alcoholic drinks. Almost without exception they are rapid and large eaters, as Janney has shown to be the natural condition in persons suffering with hyperthyroidism.

Rest is the one factor which relieves these cases in my experience. Physical rest I would place as the most potent factor and mental or emotional rest as the second. This in either instance may be accentuated by the use of bromides or the more powerful sedatives.

Assuming that our inference as to the real nature of this striking clinical picture is correct, how are we to explain the appearance of so many of these cases among the young men of the draft age, whereas it has been so uncommonly observed at other times? Why are we civilians, suddenly forced into military medicine, now for the first time seeing so many of these cases in the very people whom we have been largely handling in the past? The causes appear to me to be several, but yet very definite and logical in their action.

The role which emotional shock, fright or mental traumatism plays in the activation or evolution of Graves's disease is too well established to admit of question. Our knowledge in this respect of the hyperaction of the endocrines has been much amplified by the researches of Cannon and Crile, especially in their relation to shock and fright. The young recruits called, often unwillingly, to the Colors is frightened to a degree often beyond the understanding of many of us; for weeks or months he has been worrying and worried over what must take place. For days he has been subjected to the sentimental and nervous stress incident to his separation from his family, and he has had to bear with the emotional explosions of his female relatives, especially if of those races in whom a certain melancholy and dramatic pleasure is taken in occasions of this kind. If any of you have viewed the separations which are inflicted on many young recruits, as I have frequently seen them in the Pennsylvania Station, you may perhaps faintly realize the shock to the nervous system which the ordeal implies and the great demand which is put upon the endocrine of the young recruit as a result.

This is much exaggerated of course if a very definite unwillingness to serve exists, but I would not for one moment have you assume that it is in only such that these cases appear. One of the most definite cases which I have seen was in the person of a very brilliant Italian clergyman, but recently graduated, who nearly fainted when he found that because of his tachycardia it was unlikely that he would be accepted, and who finally, when his urgings and protestations had secured from us the privilege of a trial, ran back to his barracks shouting like a Bersaglieria at the charge.

Add to this the sexual excesses in which the young recruit often indulges before his call comes, the excesses in eating and in that last good-bye drunk and a series of conditions calling out to the superlative degree, activity on the part of the thyroids is presented which could act only in the manner detailed.

The early days spent in the cantonment serve to more accentuate these conditions. He is forced into a new and strange life, new acquaintances surround him, all also in a state of mental and physical unrest. The heavy strain of the physical examination, the newness and severity of the setting-up drill dominating and pervading it all, and oftentimes intense nostalgia, and that a tendency toward the condition should become accentuated is but to be expected.

The question of treatment of this condition is a matter which I do not wish to consider at this time for the reason that I do not feel that as yet I have a sufficient experience in this matter to speak with personal authority. Thus far with us it has been chiefly the question as to whether or not these subjects have the making of soldiers in them. Many of the cases recover under the really healthy and normal routine life of the military camp; this is particularly likely to be the case with those who are happy in their work or in whom the sense of duty and obligation overrule a natural timidity and sense of fear. If in these persons a careful training is imposed, not too severe until the recruit is prepared for heavy work, if the worry and strain is sufficiently relieved by reaction, games and camp shows, these men, oftentimes of the finest spiritual and patriotic fiber, are certain to make good soldiers, competent and spiritually equal to great and heroic deeds; but if, on the other hand, unhappiness comes or overly heavy or premature physical work are imposed, and perhaps the ridicule or worse of men of more rugged or phlegmatic temperament keeps the young soldier in a condition or a state of unhappiness and fear, he breaks either nervously or cardiac incompetence ultimately develops. This I have also seen in ambitious young men of the higher, more spiritual type who have at once striven to excel in their work and studies and to whom rapid advancement has meant unprepared-for responsibilities and worries.

The subject is an important one to us all at this time. It has been a most astonishing revelation to me, and I think to most civilian physicians who have been called into active service, and I feel that earnest study with a liberal adaptation of the excellent suggestions which have been worked out by our more experienced allies will permit us to salvage a considerable and very valuable human material which we will doubtless sorely need before many of us are able to lay aside our uniforms and return to our homes and the normal life which we all crave to such a degree that we are happy to fight for it.

EFFECTS OF "MUSTARD GAS" ON THE EYES.

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Lacrimatory gas was first used by the Germans to disable their opponents temporarily at the time of an attack. Its effects wore off very quickly and no harmful results remained.

In July, 1917, U. S. Army Base Hospital No. 5 and other hospitals in the vicinity began to receive a large number of cases poisoned by a new sort of gas which produced lesions of the eyes, the respiratory system and the skin. Since that time we have had perhaps 500 of these cases to treat.

Mustard gas is not sent over in clouds but in shells and its action is a delayed one, as it vaporizes slowly. It will hang around a locality in which it has been sent over for many hours. As this gas produces inflammation of the eyes in at least 80 per cent. of cases it is important that our medical officers should be able to recognize and to treat the ordinary case, and that our ophthalmologists who are coming over here should be well informed and prepared to help